

PATENT ABSTRACTS OF JAPAN

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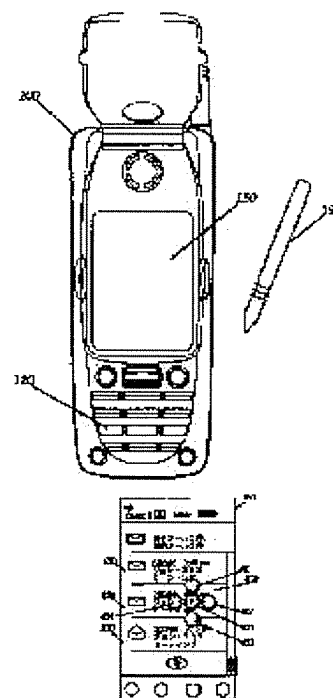
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(54) INTUITIVE GESTUER SYSTEM GRAPHICAL USER INTERFACE

(57)Abstract:

PROBLEM TO BE SOLVED: To make a manual choice or gesture choice of a screen object on the screen of an electronic device by utilizing a pointing device.

SOLUTION: After a manual choice by a single tap, the electronic device 100 automatically displays a tentative direction palette having palette buttons 451, 452, 453, 454, and 455 showing functions of the electronic device 100. Each palette button has a unique compass direction to an original tap area. A 2nd tap is made on a desired palette button and then a beginner user learns usable functions of the electronic device 100 and corresponding direction gestures. Or the user can make gesture choices of a screen object and a function by making double taps or drawing a line in a proper direction before the direction palette appears on the screen 150.



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CLAIMS

[Claim(s)]

[Claim 1] Phase which is the approach of offering the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has a screen] electronic instruments, and displays a screen object on the :A aforementioned screen (910);

B) Phase of investigating whether said user input being equivalent to manual selection by receiving the user input corresponding to selection of said screen object (920), or it corresponding to a gesture input (930);

C) It is the phase (940) of showing a direction pallet automatically on said screen. the case (933) where said user input is equivalent to manual selection -- following phase:1 -- Even if said direction pallet has at least one pallet carbon button and does not have each **, the direction of a compass where one pallet carbon button is original, phase (940); which has original functional discernment, and 2 -- the approach characterized by being constituted by phase; which performs phase (950); which receives the next user input corresponding to selection of said at least one pallet carbon button.

[Claim 2] said approach -- :D -- the case (935) where said user input is equivalent to gesture selection -- following phase:1 -- phase (970); which gives the user feedback which checks said gesture selection

2) Phase where said user input judges whether it is a functional call (960);

3) phase (980); which performs a function when said user input is a functional call (965), and 4, when said user input is not a functional call (963) The claim 1 publication characterized by consisting of on said screen, including further the phase of performing phase; which returns to the phase (940) (1 of Phase C) of showing a direction pallet automatically, How to offer the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has a screen] electronic instruments.

[Claim 3] Said user feedback is the approach of offering the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has the screen according to claim 2 characterized by being visual feedback] electronic instruments.

[Claim 4] Said user feedback is the approach of offering the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has the screen according to claim 2 characterized by being audio feedback] electronic instruments.

[Claim 5] How to offer the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has the screen according to claim 1 characterized by consisting of on said screen in front of the phase (1 of Phase C) of showing a direction pallet automatically, including further phase; which waits for a variable time period] electronic instruments.

[Claim 6] Said user input corresponding to manual selection is the approach of offering the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has the screen according to claim 1 characterized by being carrying out the draw of the point] electronic instruments.

[Claim 7] Said user input corresponding to gesture selection is the approach of offering the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for

[which has the screen according to claim 1 characterized by being carrying out the draw of Rhine] electronic instruments.

[Claim 8] How to offer the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has the screen according to claim 1 characterized by being constituted including further phase; which gives visual feedback behind the phase (phase B) of receiving a user input] electronic instruments.

[Claim 9] said approach -- :C3 -- phase (955); which investigates whether said next user input is equivalent to manual selection, or it corresponds to gesture selection

4) the case where said next user input is equivalent to manual selection -- following phase:5 -- phase (960); which judges whether said next user input is a functional call

6) phase (960); which performs a function when said next user input is a functional call (965), and 7, when said next user input is not a functional call (963) The claim 1 publication characterized by consisting of on said screen, including further phase; which performs phase; which returns to the phase (940) (1 of Phase C) of showing a direction pallet automatically, How to offer the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has a screen] electronic instruments.

[Claim 10] said approach -- :D -- the case (935) where said user input is equivalent to gesture selection - - following phase:1 -- phase (970); which gives the user feedback which checks said gesture selection

2) Phase of judging whether said user input being a functional call (960);

3) phase (960); which performs a function when said user input is a functional call (965), and 4, when said user input is not a functional call (963) The claim 9 publication characterized by consisting of on said screen, including further phase; which performs phase; which returns to the phase (940) (1 of Phase C) of showing a direction pallet automatically, How to offer the graphical user interface of the intuitive gesture method with which microprocessor control was carried out for [which has a screen] electronic instruments.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] Generally this invention relates to the graphical user interface which makes gesture possible in more detail about a user interface.

[0002]

[Description of the Prior Art] Generally, a graphical user interface uses pointing devices, such as a linearity menu (linear menu), a screen carbon button, and a mouse, a joy stick or a touchpad, in order to control electronic instruments, such as a computer or a computer control device. A pointing device chooses the area of a screen, in order to direct a desired function, and then, selection carbon buttons, such as a mouse button, order activation of the function. A menu and a screen carbon button linear in order to know whether which function of a user is available specify a function continuously, or show it by the icon, and in order for this to show a user other information, the amount of an available display tooth space is reduced. Since the screen space occupied with a linear menu and a screen carbon button is stopped to the minimum, other sub menus put additional alternative in order and pulldown **** can present an additional function at the time of selection of a main menu item.

[0003] A "gesture" user interface is used for the electronic product of some Penn methods or a stylus method as shortcut for performing the function used frequently. However, gesture is available only as an addition to the graphical user interface of the conventional linear menu and a screen carbon button, therefore the problem of reduction of any user interface of a class of screen space remains. It is easy and a gesture user interface enables quick access to a function by the familiar motion. For example, a word will be eliminated if a user does strike through [of the word] simply (from the left to the right) using a stylus instead of choosing an alphabetic character eliminating using a pointing device, and pushing "elimination" carbon button. Though regrettable, most available gesture is not so intuitive as the example of this deletion. Moreover, gesture shortcut differs from the linear menu and screen carbon button which attain the same function radically.

[0004]

[Problem(s) to be Solved by the Invention] Therefore, these gesture user interfaces mean being only used for skillful users. An entry level user does not have the means which check easily which gesture is available. An entry level user must learn available gesture and its function from user documentation or onscreen "help" documentation first, and must pass through the process which memorizes these gesture next. When gesture has been forgotten, it must return to documentation and a user has to dare try hard that the relearning of gesture and its function should be carried out. Therefore, the user interface of the gesture method with which a user can access quickly the function frequently used on an electronic instrument, and can moreover exclude the troublesomeness of documentation and which is easy to learn is needed. Moreover, the user interface of a gesture method which reduces the need for the linear menu which consumes a display tooth space, and a screen carbon button is required.

[0005]

[Example] With the graphical user interface of an intuitive gesture method, a user can learn gesture

quickly as an approach of accessing the function of the device of a computer or the computer base used frequently. Moreover, the graphical user interface of this intuitive gesture method mitigates the need for a screen carbon button of decreasing available screen space. The graphical user interface of an intuitive gesture method is preferably carried out using the device of Penn or a stylus method, and a user performs manual selection of a screen item by carrying out a tap on a pressure-sensitive screen, or carrying out the draw of the point using a stylus. After a single tap, a device presents the direction pallet equipped with the pallet carbon button which has the different direction of a compass to the core of a direction pallet. Each pallet carbon button specifies the original discernment showing other items of a function or information. For example, by the 2nd tap, the available function and the corresponding gesture of equipment understand an entry level user by making manual selection of the desired pallet carbon button. A user can carry out the draw of Rhine in the suitable direction of a compass which begins from the screen object which carried out the tap twice continuously on the screen object, or was chosen, and equipment processes this gesture selection appropriately, without displaying a direction pallet as a user grows familiar with an electronic instrument.

[0006] Drawing 1 shows drawing of the graphical user interface of the intuitive gesture method by the suitable example carried out on an electronic instrument. An electronic instrument 100 is the device of a computer or a microcomputer method preferably. An electronic instrument 100 is shown by this drawing as an one apparatus wireless communication device equipped with radiotelephony, the electronic mail, and the facsimile function. However, the combination of the desktop computer equipped with a modem (a modulator/demodulator) or a portable computer, and television/VCR, facsimile apparatus, a photocopying machine, a Personal Digital Assistant, etc. are sufficient as an electronic instrument 100. An electronic instrument 100 has the pressure-sensitive screen 150 and a push button 120. The pointing devices 190, such as Penn or a stylus, act on a screen 150 and mutual, and choose the area of a screen. Of course, other pointing devices, such as a finger of a mouse, a joy stick, a touchpad, or human being, can be used instead of Penn or a stylus.

[0007] Drawing 2 shows the detail of the screen of the electronic instrument shown in drawing 1 by the suitable example. The list of received messages in an electronic mail box etc. displays one or the screen object 210,220,230 beyond it so that this screen may be directed by the microprocessor. A screen object is the graphical expression of data. Although an electronic mail software program is used in this example The address book program which has an alphabet index as a screen object, The scheduling program which has a calender date as a screen object, The memorandum or two Do Liszt who has a list item as a screen object, The screen object of other classes can be substituted for many other programs, such as an electronic program suitable for functions, such as an electronic game which has a direction carbon button as a screen object, and photocopying or a facsimile transmission.

[0008] There are the two approaches of choosing a screen object and a related function. Manual selection of a screen object of carrying out the draw of a tap or the point calls automatically the direction pallet equipped with the pallet carbon button which has the clear discernment which shows the function corresponding to the screen object by which manual selection was made. Manual selection of pallet carbon buttons, such as the 2nd tap of a desired pallet carbon button, directs activation of the specified function. On the other hand, gesture selection can specify both a screen object and a function as coincidence. Starting from a screen object, gesture selection of carrying out the draw of Rhine which progresses in the specific direction directs a desired screen object from the start point of Rhine, and directs a desired function from the direction where the draw of Rhine is carried out.

[0009] In order to make manual selection of the screen object, the tap of the entry level user is intuitively carried out on a screen object, or it carries out the draw of the point, and chooses an electronic mail message. Drawing 3 shows the detail of the screen shown in drawing 2 at the time of a user performing manual selection of a screen object by this invention. An electronic instrument gives a user visual feedback by highlighting preferably the area 310 which carried out the tap. Audio feedback may be given to a user as an option. An electronic instrument shows a user automatically the direction pallet centered on the area of the same screen which a tap or the point produced preferably after manual selection, such as carrying out the draw of a single tap or the point.

[0010] Drawing 4 shows the detail of the screen shown in drawing 2 at the time of a direction pallet being displayed by the suitable example. The direction pallet 450 shows a user many pallet carbon buttons. Although the direction pallet 450 of illustration shows a user five pallet carbon buttons, a direction pallet may present the carbon button more than it or not more than it if needed. The configuration, dimension, and configuration of a direction pallet differ from each other according to which screen object was chosen. Each pallet carbon button has an original direction to the core of the direction pallet which is also the approximation location of the 1st tap preferably, and these directions are also called direction of a compass. Moreover, the functional discernment which describes or shows which function each pallet carbon button can access by starting this pallet carbon button is displayed.

[0011] A screen object expresses a reception mail message with the example of this electronic mail. Therefore, the direction pallet 450 which appears when manual selection of the reception mail message screen object is made has the pallet carbon button 451 which accesses a cancellation function on the north side. In the option which accesses this cancellation function, the tap of the part of the screen of the outside of a pallet is carried out. A cancellation function eliminates a current pallet from a screen, or returns the last action. At the east side, a user chooses the pallet carbon button 452 and is a transfer (forward) to another addressee about a message. It can do. On the south, the pallet carbon button 453 directs deletion of a message, and the pallet carbon button 454 demands return to the transmitting person of a message from a user on in the West. Finally, the central pallet carbon button 455 enables a user to read a message. Even if it carries out the tap of which pallet carbon button, the function specified on the pallet carbon button is called.

[0012] In order that a user may help to learn and memorize an available functional option and its related gesture, a direction pallet presents a functional option preferably as logically as possible. In this example, "return" is the west side and "a transfer" is the east side. Therefore, in a user, "return" retreats anyhow and it turns out intuitively that "a transfer" moves forward anyhow.

[0013] Drawing 5 shows the detail of the screen which shows a pallet carbon button to drawing 2 at the time of making manual selection on the direction pallet which a user shows to drawing 4 according to a suitable example. Manual selection of a pallet carbon button is carried out using the 2nd tap. If the tap of the central pallet carbon button 455 is carried out, a screen just before highlighting this pallet carbon button temporarily and showing it in drawing 2 will be changed to the selected electronic message screen so that a microprocessor may blink. Therefore, a user can read the message chosen by the 1st tap by the 2nd tap. Thus, the direction pallet 450 teaches a user carrying out a "double-tap", in order to read the selected message.

[0014] By the direction pallet furthermore shown in drawing 5, the 2nd tap on "return" pallet carbon button on the left-hand side of the 1st tap calls a return screen. The gesture corresponding to this is Rhine which carried out the draw to the left from the right as shown in drawing 6. Drawing 6 shows the detail of the screen shown in drawing 2 at the time of a user performing a screen object and gesture selection of a function according to a suitable example. Rhine which carried out the draw to the left is pursued from the right on the screen object 220 gesture and here using Rhine 620 on a screen. If return gesture is recognized by the microprocessor, the return pallet carbon button 454 appears, it will blink in order to give visual feedback, and when a user makes manual selection of the return pallet from a direction pallet, completely as a return screen appears, a return screen will appear. In addition, the mental model for accessing a function should care about that it is the same for both entry level user and skillful user. Therefore, the individual and redundant screen carbon button for entry level users is unnecessary any longer.

[0015] In order to access an available function, it becomes unnecessary for a user to wait for a direction pallet to appear, if a user memorizes gesture. Therefore, it teaches carrying out the gesture of the graphical user interface of this intuitive gesture method to an entry level user as the first meaningful approach for having a dialog with equipment. The graphical user interface of an intuitive gesture method specifies a program function by combining the graphical user interface of a gesture method with a direction pallet. However, since a user can have a dialog with equipment before a direction pallet is shown, only when required, he urges more efficient use of a screen to the graphical user interface of this

intuitive gesture method by providing a user with an explicit functional option. Furthermore, by offering the same mental model as both entry level user and skillful user, he can graduate from a beginner user more easily and it can become a skillful user.

[0016] Drawing 7 shows the detail of the screen which shows a pallet carbon button to drawing 2 at the time of making manual selection on the direction pallet which a user shows to drawing 4 according to another suitable example. In order to make the gesture and the accessible function of a number of arbitration, the "stack" of the direction pallet may be carried out. If the tap of the west side pallet carbon button 454 top described as "return" is carried out, the subpallet 750 will be called. The subpallet 750 gives only the pallet carbon button 751 of the northwest for returning two pallet carbon buttons, i.e., the transmitting person of a message, and the pallet carbon button 753 of the southwest for choosing from Liszt, a possible addressee. The subpallet 750 can carry out a stack to infinity, and can hold the pallet carbon button of the number of arbitration.

[0017] Drawing 8 shows the detail of the screen shown in drawing 2 at the time of a user performing gesture selection of a screen object according to another suitable example. In the example of the pallet which carried out the stack, gesture selection calls a subpallet to a user, or carries out direct access of the function. In this example, gesture Rhine 620 is lengthened by the user and the subpallet 750 appears. However, if this gesture continues northwestward, the return pallet carbon button 454 appears first, and it blinks, and next, the pallet carbon button 751 will appear, it will blink, and the return screen addressed to the transmitting person John of a message will replace a current screen. Therefore, both a pallet 450 and the subpallet 750 are omissible by using gesture.

[0018] Drawing 9 shows the flow chart Fig. of actuation of the graphical user interface of the intuitive gesture method by the suitable example. It is the initiation step 901, next as shown in step 910, an electronic instrument displays one or the object beyond it. Next, as shown in step 920, equipment waits for a user input. If a user input is received, some screens will be highlighted and it will give a user visual feedback. Moreover, equipment can give a user audio feedback. In step 930, it investigates whether equipment is whether the received user input is manual selection of a screen object, and gesture selection. If it is judged with a user input being manual selection (for example, tap) so that it may be shown by branching 933, equipment will display a direction pallet, as shown in step 940. Here, it investigates whether equipment is whether the user input received as a user input was highlighted as shown in waiting and step 950, and a user input was shown in step 955 is a tap, and gesture.

[0019] When the next user input is a tap, as shown in step 960, as for a microprocessor, a user input investigates whether it is a functional call. When the next user input is gesture, the pallet carbon button chosen as shown in step 970 is displayed as visual feedback, and as a microprocessor is shown in step 960, then, a user input investigates whether it is a functional call. Here, audio feedback can be used in order to check gesture selection.

[0020] As investigated at step 960, when a user input is not a functional call, equipment displays return and the following direction pallet (namely, subpallet) on step 940. The effectiveness of the pallet which carried out the stack is acquired by the loop formation 963, and this loop formation can be executed any number of times as required, until a user input serves as a functional call so that it may be shown by branching 965. If a functional call is chosen, equipment will blink the selected pallet carbon button, and a microprocessor will perform a function, as shown in step 980.

[0021] It returns to step 930, and if it is judged with an initial user input being gesture selection as shown in branching 935, in step 970, equipment will display the pallet carbon button chosen by gesture selection, and will give a user visual feedback. Next, as for equipment, direct progress and gesture judge whether it is a functional call to step 960. If the selected function is performed, the termination step 990 can arise and equipment can return to the initiation step 901.

[0022] As an option, the timing of an appearance of a direction pallet does not wait for a direction pallet to appear simply, before an entry level user performs the 2nd tap, but it may change in order to urge using gesture selection. For example, when using equipment first, a direction pallet appears quickly in response to a single tap. When a direction pallet appears quickly, a user can study an available function and its corresponding gesture first. Time amount after the 1st tap produces a direction pallet until it

appears becomes long gradually as it studies that it takes the 2nd tap for a specific approach, in order that a user may start a specific function. Therefore, before a direction pallet appears, it becomes easy for the user it became impossible to bear to perform the 2nd tap. When a user does a tap twice or the draw of Rhine is carried out before a direction pallet appears, it means that the user had adopted gesture selection, without daring strive memorizing gesture. When the user has forgotten gesture, a user should just wait until a direction pallet appears in a screen after the 1st tap, in order to do the relearning of gesture and the related function.

[0023] As mentioned above, the graphical user interface of an intuitive gesture method teaches a user the gesture for having a dialog with the electronic instrument by which microprocessor control was carried out quickly and briefly. Although the specific component and specific function of a graphical user interface of this intuitive gesture method have been explained, if it is this contractor, moreover it is more few, an additional function can be adopted without deviating from the true pneuma and the true range of this invention. This invention shall be restricted by only the claim.

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TECHNICAL FIELD

[Industrial Application] Generally this invention relates to the graphical user interface which makes gesture possible in more detail about a user interface.

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PRIOR ART

[Description of the Prior Art] Generally, a graphical user interface uses pointing devices, such as a linearity menu (linear menu), a screen carbon button, and a mouse, a joy stick or a touchpad, in order to control electronic instruments, such as a computer or a computer control device. A pointing device chooses the area of a screen, in order to direct a desired function, and then, selection carbon buttons, such as a mouse button, order activation of the function. A menu and a screen carbon button linear in order to know whether which function of a user is available specify a function continuously, or show it by the icon, and in order for this to show a user other information, the amount of an available display tooth space is reduced. Since the screen space occupied with a linear menu and a screen carbon button is stopped to the minimum, other sub menus put additional alternative in order and pulldown **** can present an additional function at the time of selection of a main menu item.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Therefore, these gesture user interfaces mean being only used for skillful users. An entry level user does not have the means which check easily which gesture is available. An entry level user must learn available gesture and its function from user documentation or onscreen "help" documentation first, and must pass through the process which memorizes these gesture next. When gesture has been forgotten, it must return to documentation and a user has to dare try hard that the relearning of gesture and its function should be carried out. Therefore, the user interface of the gesture method with which a user can access quickly the function frequently used on an electronic instrument, and can moreover exclude the troublesomeness of documentation and which is easy to learn is needed. Moreover, the user interface of a gesture method which reduces the need for the linear menu which consumes a display tooth space, and a screen carbon button is required.

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EXAMPLE

[Example] With the graphical user interface of an intuitive gesture method, a user can learn gesture quickly as an approach of accessing the function of the device of a computer or the computer base used frequently. Moreover, the graphical user interface of this intuitive gesture method mitigates the need for a screen carbon button of decreasing available screen space. The graphical user interface of an intuitive gesture method is preferably carried out using the device of Penn or a stylus method, and a user performs manual selection of a screen item by carrying out a tap on a pressure-sensitive screen, or carrying out the draw of the point using a stylus. After a single tap, a device presents the direction pallet equipped with the pallet carbon button which has the different direction of a compass to the core of a direction pallet. Each pallet carbon button specifies the original discernment showing other items of a function or information. For example, by the 2nd tap, the available function and the corresponding gesture of equipment understand an entry level user by making manual selection of the desired pallet carbon button. A user can carry out the draw of Rhine in the suitable direction of a compass which begins from the screen object which carried out the tap twice continuously on the screen object, or was chosen, and equipment processes this gesture selection appropriately, without displaying a direction pallet as a user grows familiar with an electronic instrument.

[0006] Drawing 1 shows drawing of the graphical user interface of the intuitive gesture method by the suitable example carried out on an electronic instrument. An electronic instrument 100 is the device of a computer or a microcomputer method preferably. An electronic instrument 100 is shown by this drawing as an one apparatus wireless communication device equipped with radiotelephony, the electronic mail, and the facsimile function. However, the combination of the desktop computer equipped with a modem (a modulator/demodulator) or a portable computer, and television/VCR, facsimile apparatus, a photocopying machine, a Personal Digital Assistant, etc. are sufficient as an electronic instrument 100. An electronic instrument 100 has the pressure-sensitive screen 150 and a push button 120. The pointing devices 190, such as Penn or a stylus, act on a screen 150 and mutual, and choose the area of a screen. Of course, other pointing devices, such as a finger of a mouse, a joy stick, a touchpad, or human being, can be used instead of Penn or a stylus.

[0007] Drawing 2 shows the detail of the screen of the electronic instrument shown in drawing 1 by the suitable example. Liszt of the received message in an electronic mail box etc. displays one or the screen object 210,220,230 beyond it so that this screen may be directed by the microprocessor. A screen object is the graphical expression of data. Although an electronic mail software program is used in this example The address book program which has an alphabet index as a screen object, The scheduling program which has a calender date as a screen object, The memorandum or two Do Liszt who has the Liszt item as a screen object, The screen object of other classes can be substituted for many other programs, such as an electronic program suitable for functions, such as an electronic game which has a direction carbon button as a screen object, and photocopying or a facsimile transmission.

[0008] There are the two approaches of choosing a screen object and a related function. Manual selection of a screen object of carrying out the draw of a tap or the point calls automatically the direction pallet equipped with the pallet carbon button which has the clear discernment which shows the function

corresponding to the screen object by which manual selection was made. Manual selection of pallet carbon buttons, such as the 2nd tap of a desired pallet carbon button, directs activation of the specified function. On the other hand, gesture selection can specify both a screen object and a function as coincidence. Starting from a screen object, gesture selection of carrying out the draw of Rhine which progresses in the specific direction directs a desired screen object from the start point of Rhine, and directs a desired function from the direction where the draw of Rhine is carried out.

[0009] In order to make manual selection of the screen object, the tap of the entry level user is intuitively carried out on a screen object, or it carries out the draw of the point, and chooses an electronic mail message. Drawing 3 shows the detail of the screen shown in drawing 2 at the time of a user performing manual selection of a screen object by this invention. An electronic instrument gives a user visual feedback by highlighting preferably the area 310 which carried out the tap. Audio feedback may be given to a user as an option. An electronic instrument shows a user automatically the direction pallet centered on the area of the same screen which a tap or the point produced preferably after manual selection, such as carrying out the draw of a single tap or the point.

[0010] Drawing 4 shows the detail of the screen shown in drawing 2 at the time of a direction pallet being displayed by the suitable example. The direction pallet 450 shows a user many pallet carbon buttons. Although the direction pallet 450 of illustration shows a user five pallet carbon buttons, a direction pallet may present the carbon button more than it or not more than it if needed. The configuration, dimension, and configuration of a direction pallet differ from each other according to which screen object was chosen. Each pallet carbon button has an original direction to the core of the direction pallet which is also the approximation location of the 1st tap preferably, and these directions are also called direction of a compass. Moreover, the functional discernment which describes or shows which function each pallet carbon button can access by starting this pallet carbon button is displayed.

[0011] A screen object expresses a reception mail message with the example of this electronic mail. Therefore, the direction pallet 450 which appears when manual selection of the reception mail message screen object is made has the pallet carbon button 451 which accesses a cancellation function on the north side. In the option which accesses this cancellation function, the tap of the part of the screen of the outside of a pallet is carried out. A cancellation function eliminates a current pallet from a screen, or returns the last action. At the east side, a user chooses the pallet carbon button 452 and is a transfer (forward) to another addressee about a message. It can do. On the south, the pallet carbon button 453 directs deletion of a message, and the pallet carbon button 454 demands return to the transmitting person of a message from a user on in the West. Finally, the central pallet carbon button 455 enables a user to read a message. Even if it carries out the tap of which pallet carbon button, the function specified on the pallet carbon button is called.

[0012] In order that a user may help to learn and memorize an available functional option and its related gesture, a direction pallet presents a functional option preferably as logically as possible. In this example, "return" is the west side and "a transfer" is the east side. Therefore, in a user, "return" retreats anyhow and it turns out intuitively that "a transfer" moves forward anyhow.

[0013] Drawing 5 shows the detail of the screen which shows a pallet carbon button to drawing 2 at the time of making manual selection on the direction pallet which a user shows to drawing 4 according to a suitable example. Manual selection of a pallet carbon button is carried out using the 2nd tap. If the tap of the central pallet carbon button 455 is carried out, a screen just before highlighting this pallet carbon button temporarily and showing it in drawing 2 will be changed to the selected electronic message screen so that a microprocessor may blink. Therefore, a user can read the message chosen by the 1st tap by the 2nd tap. Thus, the direction pallet 450 teaches a user carrying out a "double-tap", in order to read the selected message.

[0014] By the direction pallet furthermore shown in drawing 5, the 2nd tap on "return" pallet carbon button on the left-hand side of the 1st tap calls a return screen. The gesture corresponding to this is Rhine which carried out the draw to the left from the right as shown in drawing 6. Drawing 6 shows the detail of the screen shown in drawing 2 at the time of a user performing a screen object and gesture selection of a function according to a suitable example. Rhine which carried out the draw to the left is

pursued from the right on the screen object 220 gesture and here using Rhine 620 on a screen. If return gesture is recognized by the microprocessor, the return pallet carbon button 454 appears, it will blink in order to give visual feedback, and when a user makes manual selection of the return pallet from a direction pallet, completely as a return screen appears, a return screen will appear. In addition, the mental model for accessing a function should care about that it is the same for both entry level user and skillful user. Therefore, the individual and redundant screen carbon button for entry level users is unnecessary any longer.

[0015] In order to access an available function, it becomes unnecessary for a user to wait for a direction pallet to appear, if a user memorizes gesture. Therefore, it teaches carrying out the gesture of the graphical user interface of this intuitive gesture method to an entry level user as the first meaningful approach for having a dialog with equipment. The graphical user interface of an intuitive gesture method specifies a program function by combining the graphical user interface of a gesture method with a direction pallet. However, since a user can have a dialog with equipment before a direction pallet is shown, only when required, he urges more efficient use of a screen to the graphical user interface of this intuitive gesture method by providing a user with an explicit functional option. Furthermore, by offering the same mental model as both entry level user and skillful user, he can graduate from a beginner user more easily and it can become a skillful user.

[0016] Drawing 7 shows the detail of the screen which shows a pallet carbon button to drawing 2 at the time of making manual selection on the direction pallet which a user shows to drawing 4 according to another suitable example. In order to make the gesture and the accessible function of a number of arbitration, the "stack" of the direction pallet may be carried out. If the tap of the west side pallet carbon button 454 top described as "return" is carried out, the subpallet 750 will be called. The subpallet 750 gives only the pallet carbon button 751 of the northwest for returning two pallet carbon buttons, i.e., the transmitting person of a message, and the pallet carbon button 753 of the southwest for choosing from Liszt, a possible addressee. The subpallet 750 can carry out a stack to infinity, and can hold the pallet carbon button of the number of arbitration.

[0017] Drawing 8 shows the detail of the screen shown in drawing 2 at the time of a user performing gesture selection of a screen object according to another suitable example. In the example of the pallet which carried out the stack, gesture selection calls a subpallet to a user, or carries out direct access of the function. In this example, gesture Rhine 620 is lengthened by the user and the subpallet 750 appears. However, if this gesture continues northwestward, the return pallet carbon button 454 appears first, and it blinks, and next, the pallet carbon button 751 will appear, it will blink, and the return screen addressed to the transmitting person John of a message will replace a current screen. Therefore, both a pallet 450 and the subpallet 750 are omissible by using gesture.

[0018] Drawing 9 shows the flow chart Fig. of actuation of the graphical user interface of the intuitive gesture method by the suitable example. It is the initiation step 901, next as shown in step 910, an electronic instrument displays one or the object beyond it. Next, as shown in step 920, equipment waits for a user input. If a user input is received, some screens will be highlighted and it will give a user visual feedback. Moreover, equipment can give a user audio feedback. In step 930, it investigates whether equipment is whether the received user input is manual selection of a screen object, and gesture selection. If it is judged with a user input being manual selection (for example, tap) so that it may be shown by branching 933, equipment will display a direction pallet, as shown in step 940. Here, it investigates whether equipment is whether the user input received as a user input was highlighted as shown in waiting and step 950, and a user input was shown in step 955 is a tap, and gesture.

[0019] When the next user input is a tap, as shown in step 960, as for a microprocessor, a user input investigates whether it is a functional call. When the next user input is gesture, the pallet carbon button chosen as shown in step 970 is displayed as visual feedback, and as a microprocessor is shown in step 960, then, a user input investigates whether it is a functional call. Here, audio feedback can be used in order to check gesture selection.

[0020] As investigated at step 960, when a user input is not a functional call, equipment displays return and the following direction pallet (namely, subpallet) on step 940. The effectiveness of the pallet which

carried out the stack is acquired by the loop formation 963, and this loop formation can be executed any number of times as required, until a user input serves as a functional call so that it may be shown by branching 965. If a functional call is chosen, equipment will blink the selected pallet carbon button, and a microprocessor will perform a function, as shown in step 980.

[0021] It returns to step 930, and if it is judged with an initial user input being gesture selection as shown in branching 935, in step 970, equipment will display the pallet carbon button chosen by gesture selection, and will give a user visual feedback. Next, as for equipment, direct progress and gesture judge whether it is a functional call to step 960. If the selected function is performed, the termination step 990 can arise and equipment can return to the initiation step 901.

[0022] As an option, the timing of an appearance of a direction pallet does not wait for a direction pallet to appear simply, before an entry level user performs the 2nd tap, but it may change in order to urge using gesture selection. For example, when using equipment first, a direction pallet appears quickly in response to a single tap. When a direction pallet appears quickly, a user can study an available function and its corresponding gesture first. Time amount after the 1st tap produces a direction pallet until it appears becomes long gradually as it studies that it takes the 2nd tap for a specific approach, in order that a user may start a specific function. Therefore, before a direction pallet appears, it becomes easy for the user it became impossible to bear to perform the 2nd tap. When a user does a tap twice or the draw of Rhine is carried out before a direction pallet appears, it means that the user had adopted gesture selection, without daring strive memorizing gesture. When the user has forgotten gesture, a user should just wait until a direction pallet appears in a screen after the 1st tap, in order to do the relearning of gesture and the related function.

[0023] As mentioned above, the graphical user interface of an intuitive gesture method teaches a user the gesture for having a dialog with the electronic instrument by which microprocessor control was carried out quickly and briefly. Although the specific component and specific function of a graphical user interface of this intuitive gesture method have been explained, if it is this contractor, moreover it is more few, an additional function can be adopted without deviating from the true pneuma and the true range of this invention. This invention shall be restricted by only the claim.

[Translation done.]

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the graphical user interface of the intuitive gesture method by the suitable example carried out on an electronic instrument.

[Drawing 2] It is drawing showing the detail of the screen of the electronic instrument shown in drawing 1 by the suitable example.

[Drawing 3] It is drawing showing the detail of the screen shown in drawing 2 at the time of a user performing manual selection of a screen object according to a suitable example.

[Drawing 4] It is drawing showing the detail of the screen shown in drawing 2 at the time of a direction pallet being displayed by the suitable example.

[Drawing 5] It is drawing showing the detail of the screen which shows the pallet carbon button on the direction pallet which a user shows to drawing 4 according to a suitable example to drawing 2 at the time of making manual selection.

[Drawing 6] It is drawing showing the detail of the screen shown in drawing 2 at the time of a user making gesture selection of a screen object and the function according to a suitable example.

[Drawing 7] It is drawing showing the detail of the screen which shows the pallet carbon button on the direction pallet which a user shows to drawing 4 according to another suitable example to drawing 2 at the time of making manual selection.

[Drawing 8] It is drawing showing the detail of the screen shown in drawing 2 at the time of a user making gesture selection of the screen object according to another suitable example.

[Drawing 9] It is the flow chart Fig. showing actuation of the graphical user interface of the intuitive gesture method by the suitable example.

[Description of Notations]

100 Electronic Instrument

120 Push Button

150 Pressure-sensitive Screen

190 Pointing Device

210,220,230 Screen object

310 Area Which Carried Out Tap

450 Direction Pallet

451 North-Side (Cancellation) Pallet Carbon Button

452 East Side (Transfer) Pallet Carbon Button

453 On-the-South (Deletion) Pallet Carbon Button

454 West Side (Return) Pallet Carbon Button

455 Central (Read-out) Pallet Carbon Button

620 Gesture Rhine

750 SubPallet

751 Northwestern Pallet Carbon Button

753 Southwest Pallet Carbon Button

[Translation done.]

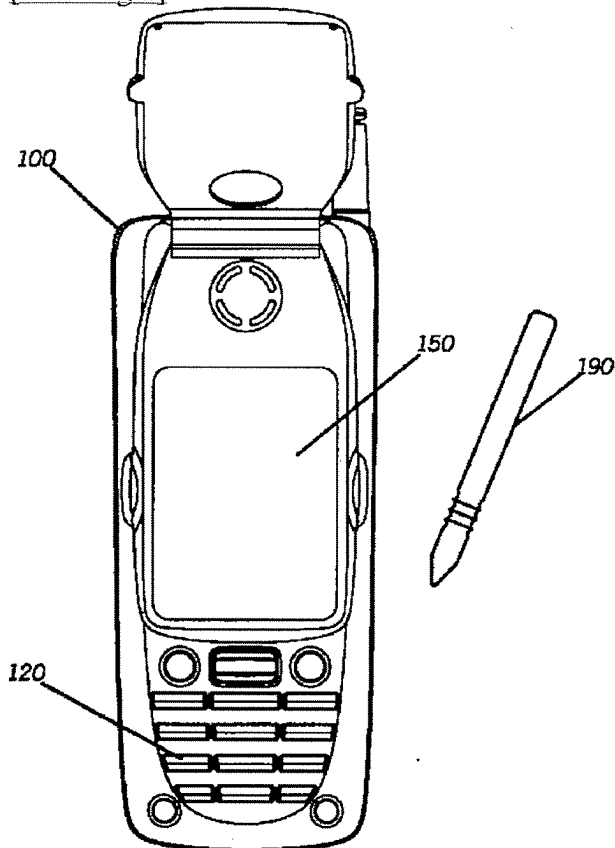
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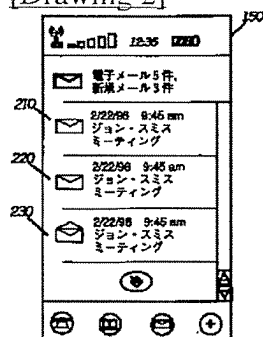
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DRAWINGS

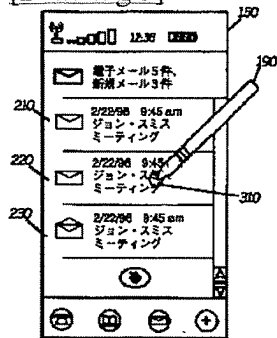
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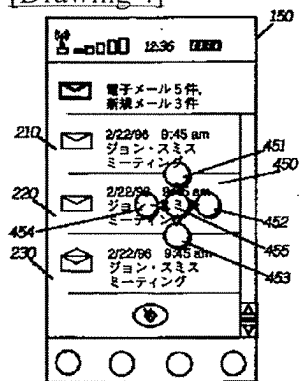
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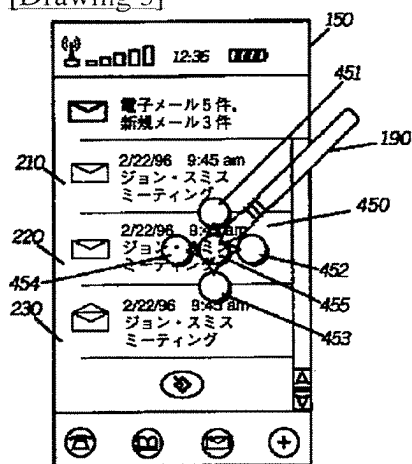
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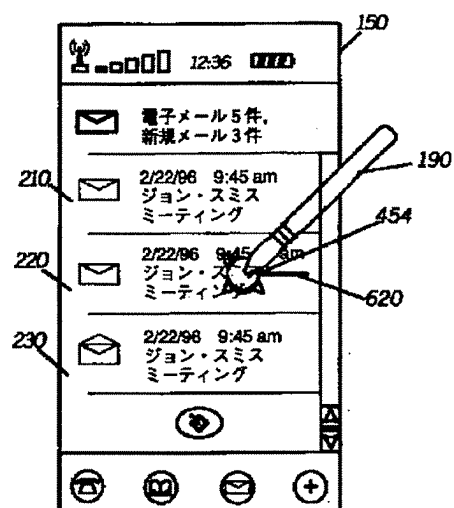
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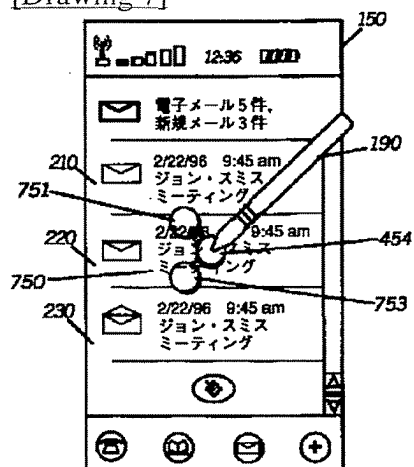
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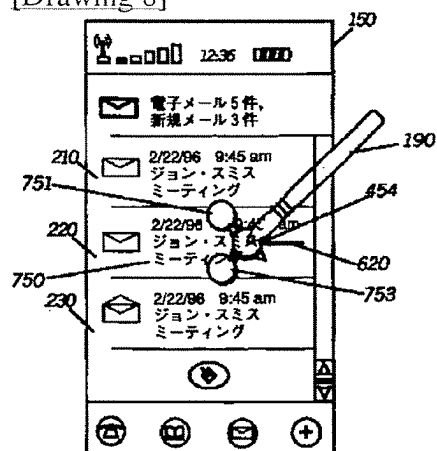
[Drawing 6]



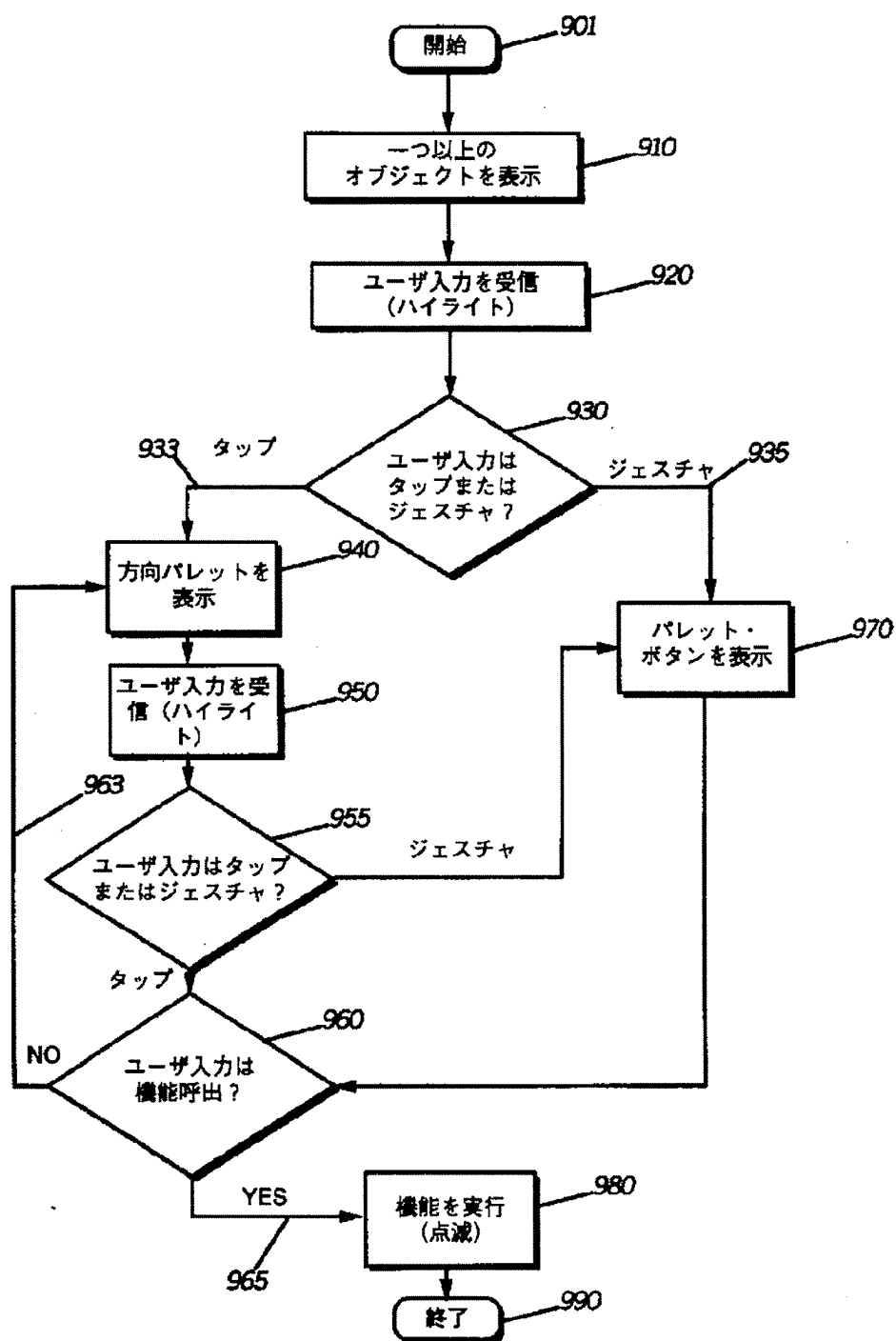
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]

(2)

特開平10-105324

1

2

【特許請求の範囲】

【請求項1】 スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法であって；

A) 前記スクリーン上でスクリーン・オブジェクトを表示する段階(910)；

B) 前記スクリーン・オブジェクトの選択に対応するユーザ入力を受信し(920)、前記ユーザ入力がマニュアル選択に対応するか、あるいはジェスチャ入力に対応するかを調べる段階(930)；

C) 前記ユーザ入力がマニュアル選択に対応する場合(933)、以下の段階；

1) 前記スクリーン上で方向パレットを自動的に提示する段階(940)であって、前記方向パレットは少なくとも一つのパレット・ボタンを有し、少なくとも一つのパレット・ボタンは独自のコンパス方向と、独自の機能識別とを有する、段階(940)；および

2) 前記少なくとも一つのパレット・ボタンの選択に対応する次のユーザ入力を受信する段階(950)；を
20 実行する段階；によって構成されることを特徴とする方法。

【請求項2】 前記方法は；

D) 前記ユーザ入力がジェスチャ選択に対応する場合(935)、以下の段階；

1) 前記ジェスチャ選択を確認するユーザ・フィードバックを与える段階(970)；

2) 前記ユーザ入力機能が機能呼出かどうかを判定する段階(960)；

3) 前記ユーザ入力機能が機能呼出の場合(965)、機能
30 を実行する段階(980)；および

4) 前記ユーザ入力機能が機能呼出でない場合(963)、前記スクリーン上で方向パレットを自動的に提示する段階(940)(段階Cの1)に戻る段階；を実行する段階をさらに含んで構成されることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項3】 前記ユーザ・フィードバックは視覚的なフィードバックであることを特徴とする請求項2記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項4】 前記ユーザ・フィードバックはオーディオ・フィードバックであることを特徴とする請求項2記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項5】 前記スクリーン上で方向パレットを自動的に提示する段階(段階Cの1)の前に、可変時間期間
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を待つ段階；をさらに含んで構成されることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項6】 マニュアル選択に対応する前記ユーザ入力は、ポイントをドローすることであることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項7】 ジェスチャ選択に対応する前記ユーザ入力は、ラインをドローすることであることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項8】 ユーザ入力を受信する段階(段階B)の後に、視覚的フィードバックを与える段階；をさらに含んで構成されることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項9】 前記方法は；

C) 3) 前記次のユーザ入力機能がマニュアル選択に対応するか、あるいはジェスチャ選択に対応するかを調べる段階(955)；

4) 前記次のユーザ入力機能がマニュアル選択に対応する場合、以下の段階；

5) 前記次のユーザ入力機能が機能呼出であるかを判定する段階(960)；

6) 前記次のユーザ入力機能が機能呼出である場合(965)、機能を実行する段階(960)；および

7) 前記次のユーザ入力機能が機能呼出でない場合(963)、前記スクリーン上で方向パレットを自動的に提示する段階(940)(段階Cの1)に戻る段階；を実行する段階；をさらに含んで構成されることを特徴とする請求項1記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【請求項10】 前記方法は；

D) 前記ユーザ入力機能がジェスチャ選択に対応する場合(935)、以下の段階；

1) 前記ジェスチャ選択を確認するユーザ・フィードバックを与える段階(970)；

2) 前記ユーザ入力機能が機能呼出であるかどうかを判定する段階(960)；

3) 前記ユーザ入力機能が機能呼出である場合(965)、機能を実行する段階(960)；および

(3)

特開平10-105324

3

4

4) 前記ユーザ入力機能が呼出でない場合(963)、前記スクリーン上で方向パレットを自動的に提示する段階(940)(段階Cの1)に戻る段階;を実行する段階;をさらに含んで構成されることを特徴とする請求項9記載の、スクリーンを有する電子装置用の、マイクロプロセッサ制御された直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを提供する方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、一般に、ユーザ・インタフェースに関し、さらに詳しくは、ジェスチャを可能にするグラフィカル・ユーザ・インタフェースに関する。

【0002】

【従来の技術】一般に、グラフィカル・ユーザ・インタフェースは、コンピュータまたはコンピュータ制御機器などの電子装置を制御するため、線形メニュー(linear menu)や、スクリーン・ボタンや、マウス、ジョイスティックまたはタッチパッドなどのポインティング・デバイスを利用する。ポインティング・デバイスは、所望の機能を指示するためにスクリーンのエリアを選択し、次にマウス・ボタンなどの選択ボタンがその機能の実行を命令する。ユーザがどの機能が利用可能かを知らずには、直線的なメニューおよびスクリーン・ボタンは、連続的に機能を明示するか、あるいはアイコンで示し、それによりユーザに他の情報を提示するために利用可能なディスプレイ・スペースの量を低減する。直線的なメニューおよびスクリーン・ボタンによって占められるスクリーン・スペースを最小限に抑えるため、プルダウンまたは他のサブメニューは補足的な選択肢を並べて、メイン・メニュー・アイテムの選択時に追加機能を提示できる。

【0003】いくつかのペン方式またはスタイラス方式の電子製品は、頻繁に利用する機能を実行するためのショートカットとして、「ジェスチャ」ユーザ・インタフェースを採用する。ただし、ジェスチャは従来の直線的なメニューおよびスクリーン・ボタンのグラフィカル・ユーザ・インタフェースに対する追加としてのみ利用可能であり、そのためいずれの種類のユーザ・インタフェースでも、スクリーン・スペースの減少の問題は残る。簡単に慣れた動きにより、ジェスチャ・ユーザ・インタフェースは機能に対する素早いアクセスを可能にする。例えば、ポインティング・デバイスを利用して消去したい文字を選択し、「消去」ボタンを押す代わりに、ユーザはスタイラスを利用して単語を(左から右に)単純にストライク・スルーすると、単語は消去される。残念ながら、利用可能なジェスチャのほとんどは、この削除の例ほど直感的ではない。また、ジェスチャ・ショートカットは、同じ機能を達成する直線的なメニューおよびスクリーン・ボタンとは根本的に異なる。

【0004】

【発明が解決しようとする課題】従って、これらのジェスチャ・ユーザ・インタフェースは、熟練ユーザ専用に使われることを意図する。初心者ユーザは、どのジェスチャが利用可能かを容易に確認する手立てがない。初心者ユーザは、まず最初に利用可能なジェスチャおよびその機能をユーザ・ドキュメンテーションまたはオンスクリーン「ヘルプ」ドキュメンテーションから学習し、次にこれらのジェスチャを記憶するプロセスを経なければならない。ジェスチャを忘れた場合、ドキュメンテーションに戻って、ユーザはジェスチャおよびその機能を再学習すべくあえて努力しなければならない。従って、ユーザが電子装置上で頻繁に利用する機能を素早くアクセスでき、しかもドキュメンテーションの煩わしさを省くことができる、学習しやすいジェスチャ方式のユーザ・インタフェースが必要になる。また、ディスプレイ・スペースを消費する直線的なメニューおよびスクリーン・ボタンの必要性を低減するジェスチャ方式のユーザ・インタフェースが要求される。

【0005】

【実施例】直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースにより、ユーザはコンピュータまたはコンピュータ・ベースの機器の頻繁に利用される機能をアクセスする方法として、ジェスチャを素早く学習できる。また、この直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースは、利用可能なスクリーン・スペースを減少させるスクリーン・ボタンの必要性を軽減する。好ましくは、直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースは、ペンまたはスタイラス方式のデバイスを利用して実施され、ユーザはスタイラスを利用して、感圧スクリーン上でタップするかポイントをドローすることによって、スクリーン・アイテムのマニュアル選択を行う。シングル・タップ後に、デバイスは、方向パレットの中心に対して異なるコンパス方向を有するパレット・ボタンを備えた方向パレットを提示する。各パレット・ボタンは、機能または情報の他のアイテムを表す独自の識別を明示する。例えば第2タップで、所望のパレット・ボタンをマニュアル選択することにより、初心者ユーザは装置の利用可能な機能とその対応するジェスチャがわかる。ユーザが電子装置に慣れるにつれて、ユーザはスクリーン・オブジェクト上で連続して2回タップするか、あるいは選択されたスクリーン・オブジェクトから始まる適切なコンパス方向にラインをドローでき、装置は方向パレットを表示せずにこのジェスチャ選択を適切に処理する。

【0006】図1は、電子装置上で実施される好適な実施例による直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースの図を示す。電子装置100は、好ましくは、コンピュータまたはマイクロコンピュータ方式の機器である。この図では、電子装置100は、無

(4)

特開平10-105324

5

6

線電話、電子メールおよびファクシミリ機能を備えた一体型ワイヤレス通信装置として示される。ただし、電子装置100は、モデム（変調器／復調器）を装備したデスクトップ・コンピュータまたはポータブル・コンピュータ、テレビ／VCRの組み合わせ、ファクシミリ装置、フォトコピー機、パーソナル・デジタル・アシスタントなどでもよい。電子装置100は、感圧スクリーン150と、ブッシュ・ボタン120とを有する。ペンまたはスタイラスなどのポインティング・デバイス190は、スクリーン150と相互に作用して、スクリーンの

【0007】図2は、好適な実施例による図1に示す電子装置のスクリーンの詳細を示す。このスクリーンは、マイクロプロセッサによって指示されるように、電子メールボックス内の受信メッセージのリストなど、一つまたはそれ以上のスクリーン・オブジェクト210、220、230を表示する。スクリーン・オブジェクトとは、データのグラフィカルな表現のことである。電子メール・ソフトウェア・プログラムがこの例で用いられるが、スクリーン・オブジェクトとしてアルファベット・インデックスを有するアドレス・ブック・プログラムや、スクリーン・オブジェクトとしてカレンダー日付を有するスケジューリング・プログラムや、スクリーン・オブジェクトとしてリスト・アイテムを有するメモまたはツー・ドゥー・リストや、スクリーン・オブジェクトとして方向ボタンを有する電子ゲームや、フォトコピーまたはファクシミリ伝送などの機能に適した電子プログラムなど、他の多くのプログラムを他の種類のスクリーン・オブジェクトで代用できる。

【0008】スクリーン・オブジェクトおよび関連機能を選択する2つの方法がある。タップまたはポイントをドローするなどの、スクリーン・オブジェクトのマニュアル選択は、マニュアル選択されたスクリーン・オブジェクトに対応する機能を示す明確な識別を有する。パレット・ボタンを備えた方向パレットを自動的に呼出す。所望のパレット・ボタンの第2タップなど、パレット・ボタンのマニュアル選択は、特定した機能の実行を指示する。一方、ジェスチャ選択は、スクリーン・オブジェクトおよび機能の両方を同時に指定することが可能である。スクリーン・オブジェクトから開始して、特定の方向に進むラインをドローするなどのジェスチャ選択は、ラインの開始点から所望のスクリーン・オブジェクトを指示し、ラインがドローされる方向から所望の機能を指示する。

【0009】スクリーン・オブジェクトをマニュアル選択するためには、初心者ユーザはスクリーン・オブジェクト上で直感的にタップするかあるいはポイントをドロー

して、電子メール・メッセージを選択する。図3は、本発明によりユーザがスクリーン・オブジェクトのマニュアル選択を行う際の、図2に示すスクリーンの詳細を示す。電子装置は、好ましくは、タップしたエリア310をハイライトすることにより、視覚的なフィードバックをユーザに与える。オプションとして、オーディオ・フィードバックをユーザに与えてもよい。シングル・タップまたはポイントをドローするなどのマニュアル選択の後、電子装置は、好ましくはタップまたはポイントが生じた同じスクリーンのエリア上にセンタリングする、方向パレットをユーザに自動的に提示する。

【0010】図4は、好適な実施例により方向パレットが表示される際の、図2に示すスクリーンの詳細を示す。方向パレット450は、ユーザに多数のパレット・ボタンを提示する。図示の方向パレット450は5つのパレット・ボタンをユーザに提示するが、方向パレットは必要に応じてそれ以上またはそれ以下のボタンを提示してもよい。方向パレットの形状、寸法および構成は、どのスクリーン・オブジェクトが選択されたかに応じて異なる。各パレット・ボタンは、好ましくは第1タップの近似位置でもある方向パレットの中心に対して、独自の方向を有し、これらの方向はコンパス方向ともいう。また、各パレット・ボタンは、このパレット・ボタンを起動することによってどの機能がアクセスできるのかを記述あるいは示す、機能識別を表示する。

【0011】この電子メールの例では、スクリーン・オブジェクトは受信メール・メッセージを表す。従って、受信メール・メッセージ・スクリーン・オブジェクトをマニュアル選択したときに現れる方向パレット450は、キャンセル機能をアクセスするパレット・ボタン451を北側に有する。このキャンセル機能をアクセスする別の方法では、パレットの外側のスクリーンの部分をタップする。キャンセル機能は、現在のパレットをスクリーンから消去するか、あるいは直前のアクションを元に戻す。京側では、ユーザはパレット・ボタン452を選択して、メッセージを別の受信者に転送(forward)できる。南側では、パレット・ボタン453はメッセージの削除を指示し、また西側では、パレット・ボタン454はメッセージの送信者への返送をユーザに促す。最後に、中央パレット・ボタン455は、ユーザがメッセージを読むことを可能にする。どのパレット・ボタンをタップしても、そのパレット・ボタン上で特定される機能は呼出される。

【0012】ユーザが利用可能な機能オプションおよびその関連ジェスチャを学習・記憶するのを助けるために、方向パレットは、好ましくは、機能オプションをできるだけ論理的に提示する。この例では、「返送」は西側であり、「転送」は京側である。従って、ユーザは、「返送」はとにかく後退し、「転送」はとにかく前進することが直感的に分かる。

(5)

特開平10-105324

7

8

【0013】図5は、好適な実施例によりユーザが図4に示す方向パレット上でパレット・ボタンをマニュアル選択する際の、図2に示すスクリーンの詳細を示す。パレット・ボタンのマニュアル選択は、第2タップを利用して実施される。中央パレット・ボタン455をタップすると、マイクロプロセッサは、あたかも点滅するように、このパレット・ボタンを一時的にハイライトし、図2に示すような直前のスクリーンは、選択された電子メッセージ・スクリーンに入れ替えられる。従って、第2タップにより、ユーザは第1タップによって選択されたメッセージを読むことができる。このように、方向パレット450は、選択されたメッセージを読むためには「ダブルタップ」することをユーザに教える。

【0014】さらに図5に示す方向パレットでは、第1タップの左側の「返送」パレット・ボタン上の第2タップは、返送スクリーンを呼出す。これに対応するジェスチャは、図6に示すように右から左にドロウしたラインである。図6は、好適な実施例によりユーザがスクリーン・オブジェクトおよび機能のジェスチャ選択を行う際の、図2に示すスクリーンの詳細を示す。ジェスチャ、ここでは、スクリーン・オブジェクト220上の右から左にドロウしたラインは、スクリーン上のライン620を利用して追跡される。返送ジェスチャがマイクロプロセッサによって認識されると、返送パレット・ボタン454が現れ、視覚的なフィードバックを与えるため点滅し、そしてユーザが方向パレットから返送パレットをマニュアル選択した場合に返送スクリーンが現れるのとまったく同じように、返送スクリーンが現れる。なお、機能をアクセスするための心理的なモデルは、初心者ユーザおよび熟練ユーザの両者にとって同じであることに留意されたい。従って、初心者ユーザ用の個別で冗長なスクリーン・ボタンはもはや必要ない。

【0015】ユーザがジェスチャを覚えると、ユーザは利用可能な機能にアクセスするために方向パレットが現れるのを待つ必要がなくなる。従って、この直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースは、装置と対話するための第一義的な方法として初心者ユーザにジェスチャすることを教える。方向パレットと、ジェスチャ方式のグラフィカル・ユーザ・インタフェースを組み合わせることにより、直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースはプログラム機能を明示する。しかし、ユーザは方向パレットが提示される前に装置と対話できるので、この直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースは、必要な場合にのみ明示的な機能オプションをユーザに提供することによって、スクリーンのより効率的な利用を促す。さらに、初心者ユーザおよび熟練ユーザの両者に同じ心理的なモデルを提供することにより、より簡単に初心者ユーザを卒業して熟練ユーザになることができる。

【0016】図7は、別の好適な実施例によりユーザが図4に示す方向パレット上でパレット・ボタンをマニュアル選択する際の、図2に示すスクリーンの詳細を示す。方向パレットは、任意の数のジェスチャおよびアクセス可能な機能を作り出すため、「スタック」してもよい。「返送」と記された西側パレット・ボタン454上をタップすると、サブパレット750が呼出される。サブパレット750は、2つのパレット・ボタン、すなわち、メッセージの送信者に返送するための北西のパレット・ボタン751と、可能な受信者のリストから選択するための南西のパレット・ボタン753のみを与える。サブパレット750は無限にスタックでき、任意の数のパレット・ボタンを収容できる。

【0017】図8は、別の好適な実施例によりユーザがスクリーン・オブジェクトのジェスチャ選択を行う際の、図2に示すスクリーンの詳細を示す。スタックしたパレットの実施例では、ジェスチャ選択はユーザにサブパレットを呼出すか、あるいは機能を直接アクセスさせる。この実施例では、ジェスチャ・ライン620はユーザによって引かれ、サブパレット750が現れる。ただし、このジェスチャが北西方向に続くと、返送パレット・ボタン454が最初に現れて点滅し、次にパレット・ボタン751が現れて点滅し、メッセージの送信者Johnに宛てられた返送スクリーンが現在のスクリーンと入れ替わる。従って、ジェスチャを利用することにより、パレット450およびサブパレット750の両方を省略できる。

【0018】図9は、好適な実施例による直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースの動作のフローチャート図を示す。開始ステップ901の次に、ステップ910に示すように、電子装置は一つまたはそれ以上のオブジェクトを表示する。次にステップ920に示すように、装置はユーザ入力待ち。ユーザ入力を受信されると、スクリーンの一部はハイライトされ、ユーザに視覚的なフィードバックを与える。また、装置はユーザにオーディオ・フィードバックを与えることができる。ステップ930において、装置は受信したユーザ入力かスクリーン・オブジェクトのマニュアル選択であるかジェスチャ選択であるかを調べる。分岐933によって示されるように、ユーザ入力かマニュアル選択（例えば、タップ）であると判定されると、装置はステップ940に示すように方向パレットを表示する。ここでも、装置はユーザ入力待ち、ステップ950に示すようにユーザ入力をハイライトし、ステップ955に示すように受信したユーザ入力かタップであるかジェスチャであるかを調べる。

【0019】次のユーザ入力かタップである場合、ステップ960に示すようにマイクロプロセッサはユーザ入力か機能呼出かどうかを調べる。次のユーザ入力かジェスチャであった場合、ステップ970に示すように選択

(6)

特開平10-105324

9

10

されたパレット・ボタンが視覚的なフィードバックとして表示され、次にマイクロプロセッサは、ステップ960に示すようにユーザ入力機能が機能呼出かどうかを調べる。ここでも、ジェスチャ選択を確認するためにオーディオ・フィードバックを利用できる。

【0020】ステップ960で調べたように、ユーザ入力が機能呼出でない場合、装置はステップ940に戻り、次の方向パレット（すなわち、サブパレット）を表示する。ループ963により、スタックしたパレットの効果が得られ、このループは、分岐965によって示されるようにユーザ入力が機能呼出となるまで、必要なだけ何度でも実行できる。機能呼出が選択されると、装置は選択されたパレット・ボタンを点滅させ、マイクロプロセッサはステップ980に示すように機能を実行する。

【0021】ステップ930に戻って、分岐935に示すように初期ユーザ入力にジェスチャ選択であると判定されると、ステップ970において装置はジェスチャ選択によって選択されたパレット・ボタンを表示し、ユーザに視覚的なフィードバックを与える。次に、装置はステップ960に直接進み、ジェスチャが機能呼出であるかどうかを判定する。選択された機能が実行されると、終了ステップ990が生じ、装置は開始ステップ901に戻ることができる。

【0022】オプションとして、方向パレットの出現のタイミングは、初心者ユーザが第2タップを行う前に方向パレットが現れるのを単純に待つのではなく、ジェスチャ選択を利用することを促すために変化してもよい。例えば、装置を最初に利用するときには、方向パレットはシングル・タップに反応して素早く現れる。方向パレットが素早く現れることにより、ユーザは最初に利用可能な機能とその対応するジェスチャとを学ぶことができる。ユーザが特定の機能を起動するために特定の手法に第2タップすることを学ぶにつれて、方向パレットは、第1タップが生じてから現れるまでの時間が次第に長くなる。そのため、辛抱できなくなったユーザは方向パレットが現れる前に第2タップを行いやすくなる。方向パレットが現れる前にユーザが2回タップするか、ラインをドロースると、ユーザはジェスチャを記憶しようとあえて努力せずに、ジェスチャ選択を採用したこととなる。ユーザがジェスチャを忘れた場合、ユーザはジェスチャおよび関連機能を再学習するため、第1タップ後に方向パレットがスクリーンに現れるまで待つだけでよい。

【0023】以上、直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースは、マイクロプロセッサ制御された電子装置と対話するためのジェスチャをユーザに素早くかつ簡単に教える。この直感的なジェスチャ

方式のグラフィカル・ユーザ・インタフェースの特定の構成要素および機能について説明してきたが、当業者であれば本発明の真の精神および範囲から逸脱せずに、より少ないまたは追加の機能を採用できる。本発明は、特許請求の範囲によってのみ制限されるものとする。

【図面の簡単な説明】

【図1】電子装置上で実施される、好適な実施例による直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースを示す図である。

【図2】好適な実施例による図1に示す電子装置のスクリーンの詳細を示す図である。

【図3】好適な実施例によりユーザがスクリーン・オブジェクトのマニュアル選択を行う際の、図2に示すスクリーンの詳細を示す図である。

【図4】好適な実施例により方向パレットが表示される際の、図2に示すスクリーンの詳細を示す図である。

【図5】好適な実施例によりユーザが図4に示す方向パレット上のパレット・ボタンをマニュアル選択する際の、図2に示すスクリーンの詳細を示す図である。

【図6】好適な実施例によりユーザがスクリーン・オブジェクトおよび機能をジェスチャ選択する際の、図2に示すスクリーンの詳細を示す図である。

【図7】別の好適な実施例によりユーザが図4に示す方向パレット上のパレット・ボタンをマニュアル選択する際の、図2に示すスクリーンの詳細を示す図である。

【図8】別の好適な実施例によりユーザがスクリーン・オブジェクトをジェスチャ選択する際の、図2に示すスクリーンの詳細を示す図である。

【図9】好適な実施例による直感的なジェスチャ方式のグラフィカル・ユーザ・インタフェースの動作を示すフローチャート図である。

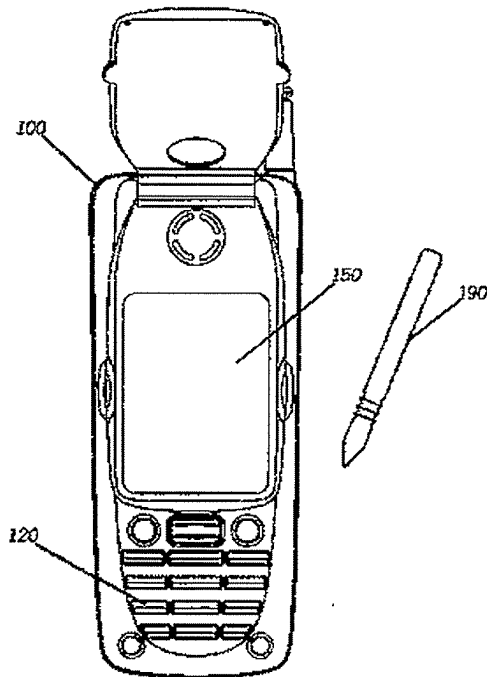
【符号の説明】

- 100 電子装置
- 120 ブッシュ・ボタン
- 150 感圧スクリーン
- 190 ポインティング・デバイス
- 210, 220, 230 スクリーン・オブジェクト
- 310 タップしたエリア
- 450 方向パレット
- 451 北側（キャンセル）パレット・ボタン
- 452 東側（転送）パレット・ボタン
- 453 南側（削除）パレット・ボタン
- 454 西側（返送）パレット・ボタン
- 455 中央（読出）パレット・ボタン
- 620 ジェスチャ・ライン
- 750 サブパレット
- 751 北西のパレット・ボタン
- 753 南西のパレット・ボタン

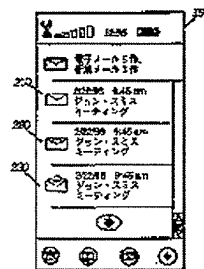
(7)

特開平10-105324

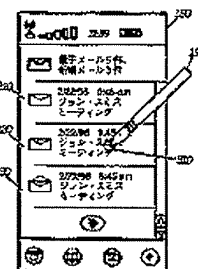
【図1】



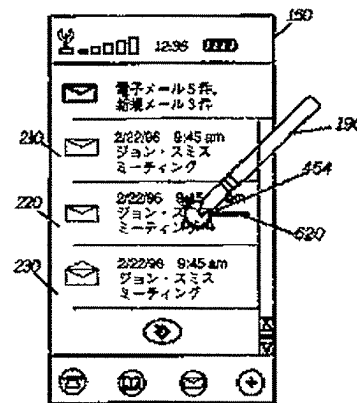
【図2】



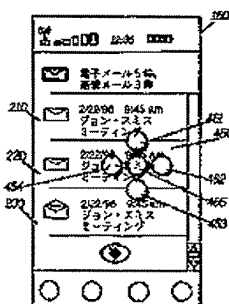
【図3】



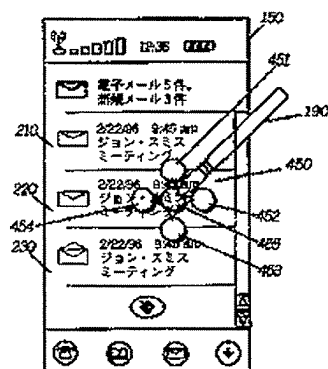
【図6】



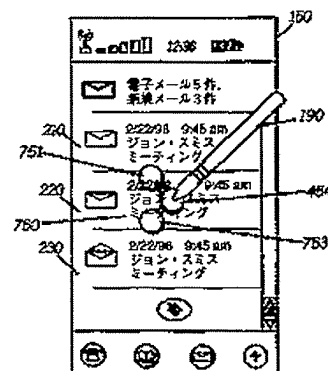
【図4】



【図5】



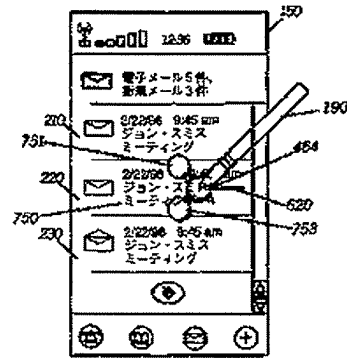
【図7】



(8)

特開平10-105324

【図8】



(9)

特開平10-105324

【図9】

